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NOTICE OF ALLOWANCE AND FEE(S) DUE

51472 7590 03/30/2009

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P.O. BOX 160727
AUSTIN, TX 78716-0727

EXAMINER	
WONG, BLANCHE	
ART UNIT	PAPER NUMBER
2419	

DATE MAILED: 03/30/2009

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/668,648	09/23/2003	Jeyhan Karaoguz	BP2910	2085

TITLE OF INVENTION: UWB (ULTRA WIDE BAND) WAVEFORM DESIGN TO MINIMIZE NARROWBAND INTERFERENCE

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	NO	$1510	$300	$0	$1810	06/30/2009

THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. PROSECUTION ON THE MERITS IS CLOSED. THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHTS. THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPON PETITION BY THE APPLICANT. SEE 37 CFR 1.313 AND MPEP 1308.

THE ISSUE FEE AND PUBLICATION FEE (IF REQUIRED) MUST BE PAID WITHIN THREE MONTHS FROM THE MAILING DATE OF THIS NOTICE OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. THIS STATUTORY PERIOD CANNOT BE EXTENDED. SEE 35 U.S.C. 151. THE ISSUE FEE DUE INDICATED ABOVE DOES NOT REFLECT A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE IN THIS APPLICATION. IF AN ISSUE FEE HAS PREVIOUSLY BEEN PAID IN THIS APPLICATION (AS SHOWN ABOVE), THE RETURN OF PART B OF THIS FORM WILL BE CONSIDERED A REQUEST TO REAPPLY THE PREVIOUSLY PAID ISSUE FEE TOWARD THE ISSUE FEE NOW DUE.

HOW TO REPLY TO THIS NOTICE:

I. Review the SMALL ENTITY status shown above.

If the SMALL ENTITY is shown as YES, verify your current SMALL ENTITY status:

A. If the status is the same, pay the TOTAL FEE(S) DUE shown above.

B. If the status above is to be removed, check box 5b on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and twice the amount of the ISSUE FEE shown above, or

If the SMALL ENTITY is shown as NO:

A. Pay TOTAL FEE(S) DUE shown above, or

B. If applicant claimed SMALL ENTITY status before, or is now claiming SMALL ENTITY status, check box 5a on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and 1/2 the ISSUE FEE shown above.

II. PART B - FEE(S) TRANSMITTAL, or its equivalent, must be completed and returned to the United States Patent and Trademark Office (USPTO) with your ISSUE FEE and PUBLICATION FEE (if required). If you are charging the fee(s) to your deposit account, section "4b" of Part B - Fee(s) Transmittal should be completed and an extra copy of the form should be submitted. If an equivalent of Part B is filed, a request to reapply a previously paid issue fee must be clearly made, and delays in processing may occur due to the difficulty in recognizing the paper as an equivalent of Part B.

III. All communications regarding this application must give the application number. Please direct all communications prior to issuance to Mail Stop ISSUE FEE unless advised to the contrary.

IMPORTANT REMINDER: Utility patents issuing on applications filed on or after Dec. 12, 1980 may require payment of maintenance fees. It is patentee's responsibility to ensure timely payment of maintenance fees when due.

PTOL-85 (Rev. 08/07) Approved for use through 08/31/2010.

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), to: Mail **Mail Stop ISSUE FEE**
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INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

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I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being facsimile transmitted to the USPTO (571) 273-2885, on the date indicated below.

(Depositor's name)
(Signature)
(Date)

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10/668,648	09/23/2003	Jeyhan Karaoguz	BP2910	2085

TITLE OF INVENTION: UWB (ULTRA WIDE BAND) WAVEFORM DESIGN TO MINIMIZE NARROWBAND INTERFERENCE

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nonprovisional	NO	$1510	$300	$0	$1810	06/30/2009

EXAMINER	ART UNIT	CLASS-SUBCLASS
WONG, BLANCHE	2419	370-342000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

❑ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.

❑ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list

(1) the names of up to 3 registered patent attorneys or agents OR, alternatively, 1_____

(2) the name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed. 2_____ 3_____

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document has been filed for recordation as set forth in 37 CFR 3.11. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE (B) RESIDENCE: (CITY and STATE OR COUNTRY)

Please check the appropriate assignee category or categories (will not be printed on the patent) : ❑ Individual ❑ Corporation or other private group entity ❑ Government

4a. The following fee(s) are submitted:

❑ Issue Fee

❑ Publication Fee (No small entity discount permitted)

❑ Advance Order - # of Copies _____

4b. Payment of Fee(s): **(Please first reapply any previously paid issue fee shown above)**

❑ A check is enclosed.

❑ Payment by credit card. Form PTO-2038 is attached.

❑ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment, to Deposit Account Number _____ (enclose an extra copy of this form).

5. **Change in Entity Status** (from status indicated above)

❑ a. Applicant claims SMALL ENTITY status. See 37 CFR 1.27.

❑ b. Applicant is no longer claiming SMALL ENTITY status. See 37 CFR 1.27(g)(2).

NOTE: The Issue Fee and Publication Fee (if required) will not be accepted from anyone other than the applicant; a registered attorney or agent; or the assignee or other party in interest as shown by the records of the United States Patent and Trademark Office.

Authorized Signature _____ Date _____

Typed or printed name _____ Registration No. _____

This collection of information is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450.

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Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)

(application filed on or after May 29, 2000)

The Patent Term Adjustment to date is 1183 day(s). If the issue fee is paid on the date that is three months after the mailing date of this notice and the patent issues on the Tuesday before the date that is 28 weeks (six and a half months) after the mailing date of this notice, the Patent Term Adjustment will be 1183 day(s).

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) WEB site (http://pair.uspto.gov).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at 1-(888)-786-0101 or (571)-272-4200.

PTOL-85 (Rev. 08/07) Approved for use through 08/31/2010.

Notice of Allowability	Application No.	Applicant(s)	
	10/668,648	KARAOGUZ, JEYHAN	
	Examiner	Art Unit	
	Blanche Wong	2419	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to *December 2, 2008*.

2. ☒ The allowed claim(s) is/are *1-84*.

3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
   a) ☐ All b) ☐ Some* c) ☐ None of the:
      1. ☐ Certified copies of the priority documents have been received.
      2. ☐ Certified copies of the priority documents have been received in Application No. _____ .
      3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

   * Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.

5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
   (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
      1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
   (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.

   Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☐ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date _____
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application
6. ☐ Interview Summary (PTO-413), Paper No./Mail Date _____ .
7. ☒ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____.

EXAMINER'S AMENDMENT

1. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Shayne X. Short (Reg No. 45,105) on February 20, 2009.

The application has been amended as follows:

1. (currently amended) A piconet that employs PN (Pseudo-Noise) codes to spread UWB (Ultra Wide Band) pulses to minimize narrowband interference, the piconet comprising:

a PNC (piconet coordinator); and

a plurality of DEVs (user piconet devices); and wherein:

~~each DEV of the plurality of DEVs and the PNC is operable to~~ two devices selected from the plurality of DEVs and the PNC communicate with one another using UWB pulses transmitted across a communication link;

based on narrowband interference within a spectrum of the UWB pulses that are transmitted across ~~a~~ the communication link ~~within the piconet~~, the PNC assigns a PN code from a plurality of PN codes to spread the UWB pulses transmitted across the communication link;

the assigned PN code has at least one narrowband blocking interval, composed of at least one zero in the assigned PN code, that ~~substantially~~ nulls at least one portion of the spectrum of the UWB pulses around which the narrowband interference is ~~substantially~~ centered thereby ~~substantially~~ eliminating the narrowband interference; and

when transmitting a UWB pulse across the communication link, at least one of the two devices ~~DEV of the plurality of DEVs and the PNC~~ spreads the UWB pulse using the PN code that is assigned from the plurality of PN codes.

2. (currently amended) The piconet of claim 1, wherein:

the narrowband interference is ~~substantially~~ centered around a predetermined frequency.

3. (original) The piconet of claim 2, wherein:

the predetermined frequency is at least one of approximately 2.4 GHz (Giga-Hertz) and approximately 5 GHz.

4. (currently amended) The piconet of claim 3, wherein:

the interference ~~substantially~~ centered around approximately 5 GHz is generated by an IEEE (Institute of Electrical & Electronics Engineers) 802.11a WLAN (Wireless Local Area Network); and

the interference ~~substantially~~ centered around approximately 2.4 GHz is generated by an IEEE 802.11b WLAN.

5. (original) The piconet of claim 4, wherein:

a region in which the IEEE 802.11a WLAN operates is predetermined; and

a region in which the IEEE 802.11b WLAN operates is predetermined.

6. (previously amended) The piconet of claim 1, wherein: the PNC transmits a respective UWB pulse to each DEV within the plurality of DEVs; after receiving its respective UWB pulse, each DEV within the plurality of DEVs transmits at least one additional respective UWB pulse back to the PNC; and

the PNC performs ranging of the relative position of each DEV within the plurality of DEVs using a time duration of a round trip of the respective transmitted UWB pulse and the received at least one additional respective UWB pulse thereby determining the relative distances between the PNC and each DEV within the plurality of DEVs.

7. (original) The piconet of claim 6, wherein:

the PNC assigns the PN code based on the relative distance between the PNC and at least one DEV of the plurality of DEVs.

8. (previously amended) The piconet of claim 6, wherein:

the PNC performs ranging of the relative position of each of the two DEVs of the plurality of DEVs using a time duration of a round trip of a transmitted UWB pulse and a received UWB pulse between them thereby determining the relative distance between the two DEVs of the plurality of DEVs;

one of the two DEVs of the plurality of DEVs provides the ranging information indicating the relative distances between the two DEVs and ~~to~~ the PNC; and

the PNC employs the ranging information indicating the relative distances between the PNC and the two DEVs as well as the ranging information indicating the relative distance between the two DEVs to perform triangulation thereby determining the specific locations of the two DEVs with respect to the PNC.

9. (original) The piconet of claim 1, wherein: the PNC includes GPS (Global Positioning System) functionality that is operable to determine the specific location of the PNC within a degree of precision;

each DEV of the plurality of DEVs includes GPS functionality that is operable to determine the specific location of that DEV within the degree of precision; and

each DEV of the plurality of DEVs communicates information corresponding to its specific location to the PNC.

10. (original) The piconet of claim 9, wherein:

the PNC assigns the PN code based on the specific location of at least one DEV of the plurality of DEVs.

11. (currently amended) The piconet of claim 1, wherein:

the PNC includes interference assessment functionality that is operable to identify a frequency around which the narrowband interference is ~~substantially~~ centered.

12. (currently amended) The piconet of claim 11, wherein: the PNC and each DEV of the plurality of DEVs operate in a silence mode for a predetermined period of time;

the PNC monitors noise within the piconet when the PNC and each DEV of the plurality of DEVs operate in the silence mode for the predetermined period of time;

the PNC performs an FFT (Fast Fourier Transform) of the noise thereby generating a PSD (Power Spectral Density) of the noise; and

the PNC identifies a peak within the PSD to identify the frequency around which the narrowband interference is ~~substantially~~ centered.

13. (currently amended) The piconet of claim 11, wherein:

the frequency around which the narrowband interference is ~~substantially~~ centered is at least one of approximately 2.4 GHz (Giga-Hertz) and approximately 5 GHz.

14. (currently amended) The piconet of claim 13, wherein:

the interference ~~substantially~~ centered around approximately 5 GHz is generated by an IEEE (Institute of Electrical & Electronics Engineers) 802.11a WLAN (Wireless Local Area Network); and

the interference ~~substantially~~ centered around approximately 2.4 GHz is generated by an IEEE 802.11b WLAN.

15. (original) The piconet of claim 1, wherein:

the UWB pulses are implemented according to CDMA (Code Division Multiple Access).

16. (original) The piconet of claim 1, wherein:

the UWB pulses are implemented according to DSSS (Direct Sequence Spread Spectrum).

17. (currently amended) The piconet of claim 1, wherein:

based on a change in a frequency around which the narrowband interference is ~~substantially~~ centered, the PNC re-assigns a different PN code of the plurality of PN codes to spread the UWB pulses transmitted across the communication link.

18. (original) The piconet of claim 1, wherein:

based on a change in a position of at least one of a DEV of the plurality of DEVs and the PNC, the PNC re-assigns a different PN code of the plurality of PN codes to spread the UWB pulses transmitted across the communication link.

19. (original) The piconet of claim 1, wherein:

the PNC sets up p2p (peer to peer)communication between two DEVs of the plurality of DEVs; and

at least one additional PN code of the plurality of PN codes is employed to spread the UWB pulses that are transmitted between the two DEVs of the plurality of DEVs that communicate via p2p communication.

20. (original) The piconet of claim 1, wherein:

the UWB pulses are generated using a frequency band of a UWB frequency spectrum that spans from approximately 3.1 GHz (Giga-Hertz) to approximately 10.6 GHz;

the UWB frequency spectrum is divided into a plurality of frequency bands; and each frequency band of the plurality of frequency bands has a bandwidth of approximately 500 MHz (Mega-Hertz).

21. (currently amended) A piconet that employs PN (Pseudo-Noise) codes to spread UWB (Ultra Wide Band) pulses to minimize narrowband interference, the piconet comprising:

a PNC (piconet coordinator); and

a plurality of DEVs (user piconet devices); and wherein:

~~each DEV of the plurality of DEVs and the PNC is operable to communicate with one another using UWB pulses;~~

the PNC transmits a respective UWB pulse to each DEV within the plurality of communication devices via a respective communication link of a plurality of communication links that couple the PNC to the plurality of DEVs;

after receiving its respective UWB pulse, each DEV within the plurality of DEVs transmits ~~a~~ at least one additional respective UWB pulse back to the PNC;

the PNC performs ranging of the relative position of each DEV within the plurality of DEVs using a time duration of a round trip of the respective transmitted UWB pulse and the received at least one additional respective UWB pulse thereby determining the relative distances between the PNC and each DEV within the plurality of DEVs;

based on narrowband interference within a spectrum of ~~the~~ UWB pulses that are transmitted across ~~a~~ one respective communication link ~~within the piconet~~ and based on the relative distance between the PNC and at least one DEV of the plurality of DEVs, the PNC assigns a PN code from a plurality of PN codes to spread the UWB pulses transmitted across the one respective communication link;

the assigned PN code has at least one narrowband blocking interval, composed of at least one zero in the assigned PN code, that ~~substantially~~ nulls at least one portion of the spectrum of the UWB pulses around which the narrowband interference is ~~substantially~~ centered thereby ~~substantially~~ eliminating the narrowband interference; and

when transmitting a UWB pulse across the one respective communication link, at least one DEV of the plurality of DEVs and the PNC spreads the UWB pulse using the PN code that is assigned from the plurality of PN codes.

22. (currently amended) The piconet of claim 21, wherein:

the narrowband interference is ~~substantially~~ centered around a predetermined frequency.

23. (original) The piconet of claim 22, wherein:

the predetermined frequency is at least one of approximately 2.4 GHz (Giga-Hertz) and approximately 5 GHz.

24. (currently amended) The piconet of claim 23, wherein:

the interference ~~substantially~~ centered around approximately 5 GHz is generated by an IEEE (Institute of Electrical & Electronics Engineers) 802.11a WLAN (Wireless Local Area Network); and

the interference ~~substantially~~ centered around approximately 2.4 GHz is generated by an IEEE 802.11b WLAN.

25.(original) The piconet of claim 24, wherein:

a region in which the IEEE 802.11a WLAN operates is predetermined; and

a region in which the IEEE 802.11b WLAN operates is predetermined.

26. (previously amended) The piconet of claim 21, wherein:

the PNC performs ranging of the relative position of each of the DEVs of the plurality of DEVs using a time duration of a round trip of a transmitted UWB pulse and a received UWB pulse between them thereby determining the relative distance between the two DEVs of the plurality of DEVs;

one of the two DEVs of the plurality of DEVs provides the ranging information indicating the relative distances between the two DEVs and the PNC; and

the PNC employs the ranging information indicating the relative distances between the PNC and the two DEVs as well as the ranging information indicating the relative distance between the two DEVs to perform triangulation thereby determining the specific locations of the two DEVs.

27. (currently amended) The piconet of claim 21, wherein:

the PNC includes interference assessment functionality that is operable to identify a frequency around which the narrowband interference is ~~substantially~~ centered.

28. (currently amended) The piconet of claim 27, wherein:

the PNC and each DEV of the plurality of DEVs operate in a silence mode for a

predetermined period of time;

the PNC monitors noise within the piconet when the PNC and each DEV of the plurality of DEVs operate in the silence mode for the predetermined period of time;

the PNC performs an FFT (Fast Fourier Transform) of the noise thereby generating a PSD (Power Spectral Density) of the noise; and

the PNC identifies a peak within the PSD to identify the frequency around which the narrowband interference is ~~substantially~~ centered.

29. (currently amended) The piconet of claim 27, wherein:

the frequency around which the narrowband interference is ~~substantially~~ centered is at least one of approximately 2.4 GHz (Giga-Hertz) and approximately 5 GHz.

30. (currently amended) The piconet of claim 29, wherein:

the interference ~~substantially~~ centered around approximately 5 GHz is generated by an IEEE (Institute of Electrical & Electronics Engineers) 802.11a WLAN (Wireless Local Area Network); and

the interference ~~substantially~~ centered around approximately 2.4 GHz is generated by an IEEE 802.11b WLAN.

31. (original) The piconet of claim 21, wherein:

the UWB pulses are implemented according to at least one of CDMA (Code Division Multiple Access) and DSSS (Direct Sequence Spread Spectrum).

32. (currently amended) The piconet of claim 21, wherein:

based on a change in a frequency around which the narrowband interference is ~~substantially~~ centered, the PNC re-assigns a different PN code of the plurality of PN codes to spread the UWB pulses transmitted across the <u>one respective</u> communication link.

33. (currently amended) The piconet of claim 21, wherein:

based on a change in a position of at least one of a DEV of the plurality of DEVs and the PNC, the PNC re-assigns a different PN code of the plurality of PN codes to spread the UWB pulses transmitted across the one respective communication link.

34. (original) The piconet of claim 21, wherein:

the PNC sets up p2p (peer to peer) communication between two DEVs of the plurality of DEVs; and

at least one additional PN code of the plurality of PN codes is employed to spread the UWB pulses that are transmitted between the two DEVs of the plurality of DEVs.

35. (original) The piconet of claim 21, wherein:

the UWB pulses are generated using a frequency band of a UWB frequency spectrum that spans from approximately 3.1 GHz (Giga-Hertz) to approximately 10.6 GHz;

the UWB frequency spectrum is divided into a plurality of frequency bands; and each frequency band of the plurality of frequency bands has a bandwidth of approximately 500 MHz (Mega-Hertz).

36. (currently amended) A piconet that employs PN (Pseudo-Noise) codes to spread UWB (Ultra Wide Band) pulses to minimize narrowband interference, the piconet comprising:

a PNC (piconet coordinator); and

a plurality of DEVs (user piconet devices); and wherein:

~~each DEV of the plurality of DEVs and the PNC is operable to~~ two devices selected from the plurality of DEVs and the PNC communicate with one another using UWB pulses transmitted across a communication link;

based on narrowband interference within a spectrum of the UWB pulses that are transmitted across ~~a~~ the communication link ~~within the piconet~~, the PNC assigns a PN code from a plurality of PN codes to spread the UWB pulses transmitted across the communication link;

the assigned PN code has at least one narrowband blocking interval, composed of at least one zero in the assigned PN code, that ~~substantially~~ nulls at least one portion of the spectrum of

the UWB pulses around which the narrowband interference is ~~substantially~~ centered thereby ~~substantially~~ eliminating the narrowband interference;

when transmitting a UWB pulse across the communication link, at least one of the two devices ~~DEV of the plurality of DEVs and the PNC~~ spreads the UWB pulse using the PN code that is assigned from the plurality of PN codes; and

the PNC includes interference assessment functionality that is operable to identify a frequency around which the narrowband interference is ~~substantially~~ centered.

37. (currently amended) The piconet of claim 36, wherein:

the PNC and each DEV of the plurality of DEVs operate in a silence mode for a predetermined period of time; the PNC monitors noise within the piconet when the PNC and each DEV of the plurality of DEVs operate in the silence mode for the predetermined period of time; the PNC performs an FFT (Fast Fourier Transform) of the noise thereby generating a PSD (Power Spectral Density) of the noise; and

the PNC identifies a peak within the PSD to identify the frequency around which the narrowband interference is ~~substantially~~ centered.

38. (currently amended) The piconet of claim 36, wherein:

the frequency around which the narrowband interference is ~~substantially~~ centered is at least one of approximately 2.4 GHz (Giga-Hertz) and approximately 5 GHz.

39. (currently amended) The piconet of claim 38, wherein:

the interference ~~substantially~~ centered around approximately 5 GHz is generated by an IEEE (Institute of Electrical & Electronics Engineers) 802.11a WLAN (Wireless Local Area Network); and

the interference ~~substantially~~ centered around approximately 2.4 GHz is generated by an IEEE 802.11b WLAN.

40. (previously amended) The piconet of claim 36, wherein:

the PNC transmits a respective UWB pulse to each DEV within the plurality of DEVs;

after receiving its respective UWB pulse, each DEV within the plurality of DEVs transmits ~~a~~ at least one additional respective UWB pulse back to the PNC; and

the PNC performs ranging of the relative position of each DEV within the plurality of DEVs using a time duration of a round trip of the respective transmitted UWB pulse and the received at least one additional respective UWB pulse thereby determining the relative distances between the PNC and each DEV within the plurality of DEVs.

41. (original) The piconet of claim 40, wherein:

the PNC assigns the PN code based on the relative distance between the PNC and at least one DEV of the plurality of DEVs.

42. (previously amended) The piconet of claim 40, wherein:

the PNC performs ranging of the relative position of each of the two DEVs of the plurality of DEVs using a time duration of a round trip of a transmitted UWB pulse and a received UWB pulse between them thereby determining the relative distances between the two DEVs of the plurality of DEVs;

one of the two DEVs of the plurality of DEVs provides the ranging information indicating the relative distances between the two DEVs and ~~to~~ the PNC; and

the PNC employs the ranging information indicating the relative distances between the PNC and the two DEVs as well as the ranging information indicating the relative distance between the two DEVs to perform triangulation thereby determining the specific locations of the two DEVs.

43. (original) The piconet of claim 36, wherein:

the PNC includes GPS (Global Positioning System) functionality that is operable to determine the specific location of the PNC within a degree of precision;

each DEV of the plurality of DEVs includes GPS functionality that is operable to determine the specific location of that DEV within the degree of precision; and

each DEV of the plurality of DEVs communicates information corresponding to its

specific location to the PNC.

44. (original) The piconet of claim 43, wherein:

the PNC assigns the PN code based on the specific location of at least one DEV of the plurality of DEVs.

45. (currently amended) The piconet of claim 36, wherein:

based on a change in a frequency around which the narrowband interference is ~~substantially~~ centered, the PNC re-assigns a different PN code of the plurality of PN codes to spread the UWB pulses transmitted across the communication link.

46. (original) The piconet of claim 36, wherein:

based on a change in a position of at least one of a DEV of the plurality of DEVs and the PNC, the PNC re-assigns a different PN code of the plurality of PN codes to spread the UWB pulses transmitted across the communication link.

47. (original) The piconet of claim 36, wherein:

the UWB pulses are generated using a frequency band of a UWB frequency spectrum that spans from approximately 3.1 GHz (Giga-Hertz) to approximately 10.6 GHz;

the UWB frequency spectrum is divided into a plurality of frequency bands; and

each frequency band of the plurality of frequency bands has a bandwidth of approximately 500 MHz (Mega-Hertz).

48. (currently amended) A piconet that employs PN (Pseudo-Noise) codes to spread UWB (Ultra Wide Band) pulses to minimize narrowband interference, the piconet comprising:

a PNC (piconet coordinator) that operates as a master device; and

a plurality of DEVs (user piconet devices) that operate as slave devices with respect to the PNC that operates as the master device; and wherein:

~~each DEV of the plurality of DEVs and the PNC is operable to~~ two devices selected from

the plurality of DEVs and the PNC communicate with one another using UWB pulses transmitted across a communication link;

based on narrowband interference within a spectrum of the UWB pulses that are transmitted across ~~a~~ the communication link ~~within the piconet~~, the PNC assigns a PN code from a plurality of PN codes to spread the UWB pulses transmitted across the communication link;

the assigned PN code has at least one narrowband blocking interval, composed of at least one zero in the assigned PN code, that ~~substantially~~ nulls at least one portion of the spectrum of the UWB pulses around which the narrowband interference is ~~substantially~~ centered thereby ~~substantially~~ eliminating the narrowband interference;

when transmitting a UWB pulse across the communication link, at least one of the two devices ~~DEV of the plurality of DEVs and the PNC~~ spreads the UWB pulse using the PN code that is assigned from the plurality of PN codes; and

the narrowband interference is ~~substantially~~ centered around a predetermined frequency.

49. (original) The piconet of claim 48, wherein:

the predetermined frequency is at least one of approximately 2.4 GHz (Giga-Hertz) and approximately 5 GHz.

50. (currently amended) The piconet of claim 49, wherein:

the interference ~~substantially~~ centered around approximately 5 GHz is generated by an IEEE (Institute of Electrical & Electronics Engineers) 802.11a WLAN (Wireless Local Area Network); and

the interference ~~substantially~~ centered around approximately 2.4 GHz is generated by an IEEE 802.11b WLAN.

51. (original) The piconet of claim 50, wherein:

a region in which the IEEE 802.11a WLAN operates is predetermined; and

a region in which the IEEE 802.11b WLAN operates is predetermined.

52. (original) The piconet of claim 48, wherein: the PNC sets up p2p (peer to peer) communication between two DEVs of the plurality of DEVs; and

at least one additional PN code of the plurality of PN codes is employed to spread the UWB pulses that are transmitted between the two DEVs of the plurality of DEVs.

53. (currently amended) The piconet of claim 48, wherein:

based on a change in a frequency around which the narrowband interference is ~~substantially~~ centered, the PNC re-assigns a different PN code of the plurality of PN codes to spread the UWB pulses transmitted across the communication link.

54. (original) The piconet of claim 48, wherein:

based on a change in a position of at least one of a DEV of the plurality of DEVs and the PNC, the PNC re-assigns a different PN code of the plurality of PN codes to spread the UWB pulses transmitted across the communication link.

55. (original) The piconet of claim 48, wherein:

the UWB pulses are generated using a frequency band of a UWB frequency spectrum that spans from approximately 3.1 GHz (Giga-Hertz) to approximately 10.6 GHz;

the UWB frequency spectrum is divided into a plurality of frequency bands; and

each frequency band of the plurality of frequency bands has a bandwidth of approximately 500 MHz (Mega-Hertz).

56. (currently amended) A piconet operating method, the method comprising:

assigning a PN (Pseudo-Noise) code that is operable to spread UWB (Ultra Wide Band) pulses that are transmitted across a communication link that communicatively couples two devices within a piconet that includes a plurality of DEVs (user piconet devices) and a PNC (piconet coordinator);

using at least one zero within the PN code, ~~substantially~~ nulling at least a portion of a spectrum of the UWB pulses;

wherein the at least one zero within the PN code spectrally conincides with narrowband interference thereby nulling ~~substantially eliminates~~ the narrowband interference; and

operating the communication link that communicatively couples two devices using the assigned PN code.

57. (currently amended) The method of claim 56, wherein:

the narrowband interference is ~~substantially~~ centered around a predetermined frequency.

58. (original) The method of claim 57, wherein:

the predetermined frequency is at least one of approximately 2.4 GHz (Giga-Hertz) and approximately 5 GHz.

59. (currently amended) The method of claim 58, wherein:

the interference ~~substantially~~ centered around approximately 5 GHz is generated by an IEEE (Institute of Electrical & Electronics Engineers) 802.11a WLAN (Wireless Local Area Network); and

the interference ~~substantially~~ centered around approximately 2.4 GHz is generated by an IEEE 802.11b WLAN.

60. (original) The method of claim 59, wherein:

a region in which the IEEE 802.11a WLAN operates is predetermined; and

a region in which the IEEE 802.11b WLAN operates is predetermined.

61. (original) The method of claim 56, further comprising:

determining the relative distance between the PNC and at least one DEV of the plurality of devices within the piconet using ranging that employs a time duration of a round trip of a transmitted UWB pulse and a received UWB pulse between the PNC and the at least one DEV of the plurality of devices; and

assigning the PN code based on the relative distance between the PNC and the at least

one DEV of the plurality of DEVs.

62. (original) The method of claim 56, further comprising:

determining the position of each DEV of the plurality of DEVs and the PNC using GPS (Global Positioning System) functionality contained within each DEV of the plurality of DEVs and the PNC;

wherein the GPS (Global Positioning System) functionality is operable to determine the specific location of the respective device within a degree of precision; and

assigning the PN code based on the positions of the PNC and each DEV of the plurality of DEVs.

63. (currently amended) The method of claim 56, further comprising:

based on a change in a frequency around which the narrowband interference is ~~substantially~~ centered, re-assigning a different PN code of the plurality of PN codes to spread the UWB pulses transmitted across the communication link.

64. (original) The method of claim 56, further comprising:

based on a change in a position of at least one of a DEV of the plurality of DEVs and the PNC, re-assigning a different PN code of the plurality of PN codes to spread the UWB pulses transmitted across the communication link.

65. (currently amended) The method of claim 56, further comprising:

performing interference assessment to identify a frequency around which the narrowband interference is ~~substantially~~ centered.

66. (currently amended) The method of claim 65, further comprising:

operating the PNC and each DEV of the plurality of DEVs in a silence mode for a predetermined period of time; monitoring noise within the piconet when operating the PNC and each DEV of the plurality of DEVs in the silence mode for the predetermined period of time; and

performing an FFT (Fast Fourier Transform) of the noise thereby generating a PSD (Power Spectral Density) of the noise; and

identifying a peak within the PSD to identify the frequency around which the narrowband interference is ~~substantially~~ centered.

67. (currently amended) The method of claim 65, wherein:

the frequency around which the narrowband interference is ~~substantially~~ centered is at least one of approximately 2.4 GHz (Giga-Hertz) and approximately 5 GHz.

68. (currently amended) The method of claim 67, wherein:

the interference ~~substantially~~ centered around approximately 5 GHz is generated by an IEEE (Institute of Electrical & Electronics Engineers) 802.11a WLAN (Wireless Local Area Network); and

the interference ~~substantially~~ centered around approximately 2.4 GHz is generated by an IEEE 802.11b WLAN.

69. (currently amended) A piconet operating method, the method comprising:

assigning a PN (Pseudo-Noise) code that is operable to spread UWB (Ultra Wide Band) pulses that are transmitted across a communication link that communicatively couples two devices within a piconet that includes a plurality of DEVs (user piconet devices) and a PNC (piconet coordinator);

using at least one zero within the PN code, ~~substantially~~ nulling at least a portion of a spectrum of the UWB pulses;

wherein the at least one zero within the PN code spectrally coincides with narrowband interference thereby nulling ~~substantially eliminates~~ the narrowband interference; and

operating the communication link that communicatively couples two devices using the assigned PN code; and wherein the narrowband interference is ~~substantially~~ centered around a predetermined frequency.

70. (original) The method of claim 69, wherein:

the predetermined frequency is at least one of approximately 2.4 GHz (Giga-Hertz) and approximately 5 GHz.

71. (currently amended) The method of claim 70, wherein:

the interference ~~substantially~~ centered around approximately 5 GHz is generated by an IEEE (Institute of Electrical & Electronics Engineers) 802.11a WLAN (Wireless Local Area Network); and

the interference ~~substantially~~ centered around approximately 2.4 GHz is generated by an IEEE 802.11b WLAN.

72. (original) The method of claim 71, wherein:

a region in which the IEEE 802.11a WLAN operates is predetermined; and

a region in which the IEEE 802.11b WLAN operates is predetermined.

73. (original) The method of claim 69, further comprising:

determining the relative distance between the PNC and at least one DEV of the plurality of devices within the piconet using ranging that employs a time duration of a round trip of a transmitted UWB pulse and a received UWB pulse between the PNC and the at least one DEV of the plurality of devices; and

assigning the PN code based on the relative distance between the PNC and the at least one DEV of the plurality of DEVs.

74. (original) The method of claim 69, further comprising:

determining the position of each DEV of the plurality of DEVs and the PNC using GPS (Global Positioning System) functionality contained within each DEV of the plurality of DEVs and the PNC;

wherein the GPS (Global Positioning System) functionality is operable to determine the specific location of the respective device within a degree of precision; and

assigning the PN code based on the positions of the PNC and each DEV of the plurality of DEVs.

75. (currently amended) The method of claim 69, further comprising:

based on a change in a frequency around which the narrowband interference is ~~substantially~~ centered, re-assigning a different PN code of the plurality of PN codes to spread the UWB pulses transmitted across the communication link.

76. (original) The method of claim 69, further comprising:

based on a change in a position of at least one of a DEV of the plurality of DEVs and the PNC, re-assigning a different PN code of the plurality of PN codes to spread the UWB pulses transmitted across the communication link.

77. (currently amended) A piconet operating method, the method comprising:

performing interference assessment of a communication link that communicatively couples two devices within a piconet that includes a plurality of DEVs (user piconet devices) and a PNC (piconet coordinator) to identify a frequency around which the narrowband interference is ~~substantially~~ centered;

assigning a PN (Pseudo-Noise) code that is operable to spread UWB (Ultra Wide Band) pulses that are transmitted across the communication link;

using at least one zero within the PN code, ~~substantially~~ nulling at least a portion of a spectrum of the UWB pulses;

wherein the at least one zero within the PN code spectrally coincides with narrowband interference thereby nulling ~~substantially eliminates~~ the narrowband interference; and

operating the communication link that communicatively couples two devices using the assigned PN code.

78. (currently amended) The method of claim 77, further comprising:

operating the PNC and each DEV of the plurality of DEVs in a silence mode for a

predetermined period of time;

monitoring noise within the piconet when operating the PNC and each DEV of the plurality of DEVs in the silence mode for the predetermined period of time; and

performing an FFT (Fast Fourier Transform) of the noise thereby generating a PSD (Power Spectral Density) of the noise; and

identifying a peak within the PSD to identify the frequency around which the narrowband interference is ~~substantially~~ centered.

79. (currently amended) The method of claim 77, wherein:

the frequency around which the narrowband interference is ~~substantially~~ centered is at least one of approximately 2.4 GHz (Giga-Hertz) and approximately 5 GHz.

80. (currently amended) The method of claim 79, wherein:

the interference ~~substantially~~ centered around approximately 5 GHz is generated by an IEEE (Institute of Electrical & Electronics Engineers) 802.11a WLAN (Wireless Local Area Network); and

the interference ~~substantially~~ centered around approximately 2.4 GHz is generated by an IEEE 802.11b WLAN.

81. (original) The method of claim 77, further comprising:

determining the relative distance between the PNC and at least one DEV of the plurality of devices within the piconet using ranging that employs a time duration of a round trip of a transmitted UWB pulse and a received UWB pulse between the PNC and the at least one DEV of the plurality of devices; and

assigning the PN code based on the relative distance between the PNC and the at least one DEV of the plurality of DEVs.

82. (original) The method of claim 77, further comprising:

determining the position of each DEV of the plurality of DEVs and the PNC using GPS

(Global Positioning System) functionality contained within each DEV of the plurality of DEVs and the PNC;

wherein the GPS (Global Positioning System) functionality is operable to determine the specific location of the respective device within a degree of precision; and

assigning the PN code based on the positions of the PNC and each DEV of the plurality of DEVs.

83. (currently amended) The method of claim 77, further comprising:

based on a change in a frequency around which the narrowband interference is ~~substantially~~ centered, re-assigning a different PN code of the plurality of PN codes to spread the UWB pulses transmitted across the communication link.

84. (original) The method of claim 77, further comprising:

based on a change in a position of at least one of a DEV of the plurality of DEVs and the PNC, re-assigning a different PN code of the plurality of PN codes to spread the UWB pulses transmitted across the communication link.

2. The following is an examiner's statement of reasons for allowance:

With regard to claims 1,21,36,48, the prior art of record fails to anticipate or make obvious "… the assigned PN code has at least one narrowband blocking interval, composed of at least one zero in the assigned PN code, that nulls at least one portion of the spectrum of the UWB pulses around which the narrow band interference is centered thereby eliminating the narrowband interference …."

With regard to claims 56,69,77, the prior art of record fails to anticipate or make obvious "… using at least one zero within the PN code, nulling at least a portion of a spectrum of the UWB pulses; wherein the at least one zero within the PN code spectrally coincides with narrowband interference thereby nulling the narrowband interference …."

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

3. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Blanche Wong whose telephone number is 571-272-3177. The examiner can normally be reached on Monday through Friday, 830am to 530pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edan Orgad can be reached on 571-272-7884. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Blanche Wong/
Examiner, Art Unit 2419
February 25, 2009

/Edan Orgad/
Supervisory Patent Examiner, Art Unit 2419